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## Early Silurian graptolites from Cadia, New South Wales

### Abstract

A low-diversity graptolite fauna is reported from the Ulah Formation at Cadia, central western New South Wales. The assemblage includes *Testograptus testis*, *Monoclimacis flumendosae*, fragments of *Monograptus flemingii*, possible *Cyrtograptus* and unidentifiable retiolitid meshworks, and is correlated with the lungrenitestis Biozone, of late Wenlock (Early Silurian) age.

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# Early Silurian Graptolites from Cadia, New South Wales

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Rickards, R.B. and Wright, A.J. (2004). Early Silurian graptolites from Cadia, New South Wales. *Proceedings of the Linnean Society of New South Wales* **125**, 173-175.

A low-diversity graptolite fauna is reported from the Ulah Formation at Cadia, central western New South Wales. The assemblage includes *Testograptus testis*, *Monoclimacis flumendosae*, fragments of *Monograptus flemingii*, possible *Cyrtograptus* and unidentifiable retiolitid meshworks, and is correlated with the *lundgreni-testis* Biozone, of late Wenlock (Early Silurian) age.

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KEY WORDS: Cadia, graptolites, Lower Silurian, Wenlock.

## INTRODUCTION

Three Silurian faunas were documented by Rickards et al. (2000) from the vicinity of Cadia open cut, south of Orange, New South Wales. One of these faunas, of late Wenlock-early Ludlow aspect, consisted of shelly fossils and graptolites collected by Dr Ian Percival from a slumped mudstone at a locality on the access road to the Cadia open cut. This fauna was discussed and illustrated by Rickards et al. (2000), who figured but could not determine the poor graptolite material to genus or species because of the poor preservation of the fragmentary material. The locality (grid reference 687240E, 6295047 N, Canowindra 8360-N 1:50 000 topographic sheet) is on the eastern face of the access road to the Cadia open cut, about 1 km from the entrance gates; a map of the region showing the location of this and other fossil localities was provided by Rickards et al. (2000, Fig. 1). The fossiliferous strata are considered to correlate with the Ulah Formation, at Four Mile Creek west of Cadia (see Rickards et al. 2000, Fig. 1), in which the *Testograptus testis* fauna occurs.

## NOTES ON THE GRAPTOLITE FAUNA

Since the publication of Rickards et al. (2000), we have made a further but small graptolite collection from the Cadia mine shelly fossil locality which permits fuller identification of the low-diversity fauna and determination of its age. The Cadia graptolite fauna consists of *Testograptus testis* (Barrande),

*Monoclimacis flumendosae* (Gortani), fragments of *Monograptus flemingii* (Salter), fragmentary stipes possibly belonging to *Cyrtograptus*, and fragmentary retiolitid meshworks which cannot be assigned, even approximately, to a genus.

In discussing this as 'the Cadia graptolite fauna' we are mindful of the presence of other graptolites in Silurian strata in the vicinity of the Cadia mine. Full documentation of any such graptolite faunas as that documented here is important as graptolite localities in the vicinity of Cadia mine (such as the Pridoli 'borrow pit' locality, W910 of Rickards et al. 2000) are very much less common than at Four Mile Creek, and are under threat. A brief review of graptolites previously reported from Cadia by Offenberg (1963) was given by Rickards et al. (2000).

We have not provided here any systematic descriptions of the fauna, but limited comments on the morphological detail are included in the explanatory text for Figure 1. The Cadia specimens have undergone soft sediment deformation, with a considerable amount of twisting and breakage, in contrast to the Rodds Creek black shale specimens (Rickards et al. 2000) which were undeformed other than by diagenetic flattening.

## AGE OF THE CADIA GRAPTOLITE FAUNA

The dominant species is *Testograptus testis* (Barrande), which normally indicates the late Wenlock (Early Silurian) *lundgreni-testis* Biozone. *Testograptus testis* has been recorded, very rarely, from the *ludensis*

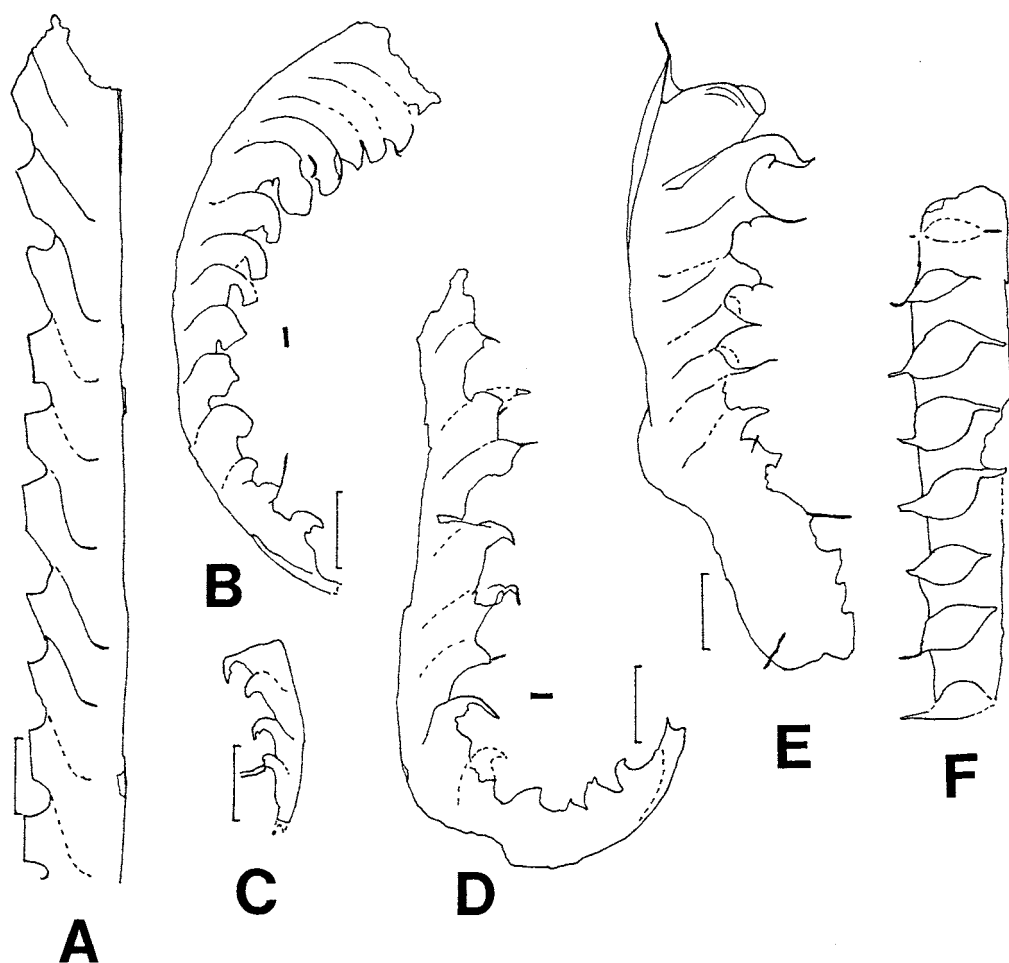


Figure 1. (A) *Monoclimacis flumendosae* (Gortani), AM F114926, distal thecae, undeformed, low relief. (B-E) *Testograptus testis* (Barrande). (B) proximal end, AM F114928, showing some soft sediment deformation distally; (C) AM F114925, a proximal end with spines visible on th1; (D) AM F114930, spines on several thecae; (E) AM F114929, distal thecae with a growing end visible. (F) *Monograptus flemingii* (Salter), AM F114927, subscalariform view of mesial thecae.

All figures x10, scale bar 1mm; heavy bar indicates deformation stretching direction, possibly not tectonic. All specimens from locality W 937, grid reference 687240E, 6295047 N, Canowindra 8360-N 1:50 000 topographic sheet. Unfigured specimens are AMF 114931-940.

Biozone (Rickards et al. 1995) but, as the Cadia specimens are abundant and occur with *Monoclimacis flumendosae* (Gortani), a pre-*ludensis* Biozone is indicated for this fauna.

The Cadia fauna is probably slightly younger than the Rodds Creek fauna (Rickards et al. 2000). Although this latter assemblage included some *lundgreni-testis* Biozone indicators, the presence of *Cyrtograptus* ex gr. *rigidus* Tullberg indicated a probable middle rather than late Wenlock for the Rodds Creek fauna. The Cadia fauna is thus significantly older than the Pridoli fauna from the 'borrow pit' locality (W910) 2 km to the southeast (Rickards et al. 2000).

Correlation with the Four Mile Creek sequence is probably with *testis*-bearing beds of the Ulah Formation in Wallace Creek; in Spring and Quarry Creeks, the *testis*-bearing beds of the same formation are largely green and black mudstones (Packham, Rickards and Wright, unpublished data).

#### SHELLY FAUNAS

The disarticulated and fragmental shelly fauna in this slump unit is unusually abundant and diverse for the region, in contrast with clastic units of

this age in the Four Mile Creek area and the Spring-Quarry Creek areas which are singularly poor in shelly fossils. The faunas at Cadia have undergone soft-sediment deformation and are clearly transported. Described shelly faunas (other than corals) from the Four Mile Creek area and the Spring Creek areas are limited to two species of *ludensis* Biozone brachiopods described by Rickards and Wright (1997) from Cobblers Creek (see Fig. 1 of Rickards et al. 2000) and by Wright and Strusz (2004) from Spring Creek and Wallace Creek (see Fig. 1 of Rickards et al. 2000: *ludensis* Biozone and *lundgreni-testis* Biozone respectively). Other brachiopod faunas from the region were listed by Jenkins (1978, 1986), but the only rich faunas cited by him are from Llandoverly (Early Silurian) limestones.

### CONCLUSIONS

Graptolites identified from the Cadia Mine access road locality are *Testograptus testis*, *Monoclimacis flumendosae*, fragments of *Monograptus flemingii*, ?*Cyrtograptus* and retiolitids. The fauna is late Wenlock (Early Silurian) and is probably best correlated with a level high in the *lundgreni-testis* Biozone. It appears to be slightly younger than the probably middle Wenlock Rodds Creek black shale fauna (Rickards et al. 2000), and is assumed to correlate with the *testis* fauna of the Ulah Formation in the Four Mile Creek area to the west of Cadia.

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### REFERENCES

- Jenkins, C.J. (1978). Llandoverly and Wenlock stratigraphy of the Panuara area, central New South Wales. *Proceedings of the Linnean Society of New South Wales* **102**, 109-130.
- Jenkins, C.J. (1986). *The Silurian of mainland Australia: a field guide*. 82 p. IUGS Silurian Subcommittee, Sydney.
- Offenberg, A.C. (1963). *Geology of the Panuara-Cadia-Errowanbong area, south of Orange, New South Wales*. BSc (Hons) thesis, University of Sydney (unpublished), 112 p.
- Rickards, R.B., Packham, G.H., Wright, A.J. and Williamson, P.L. (1995). Wenlock and Ludlow graptolite faunas and biostratigraphy of the Quarry Creek district, New South Wales. *Association of Australasian Palaeontologists, Memoir* **17**, 1-68.
- Rickards, R.B., Percival, I.G., Simpson, A.J. and Wright, A.J. (2000). Silurian biostratigraphy of the Cadia area, near Orange, New South Wales. *Proceedings of the Linnean Society of New South Wales* **123**, 173-191.
- Rickards, R.B. and Wright, A.J. (1997). Graptolite zonation in the late Wenlock (Early Silurian), with a new graptolite-brachiopod fauna from New South Wales. *Records of the Australian Museum* **49**, 229-248.
- Wright, A.J. and Strusz, D.L. (2004). Wenlock (Early Silurian) brachiopods from the Orange district of New South Wales. *Proceedings of the Linnean Society of New South Wales* **125**, 165-172.

